IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the Application of:	Xiaochun Nie, et al.	
Serial No.:	10/716,316	Examiner: David N. Werner
Filing Date:	11/17/2003	Group Art Unit: 2621
For:	METHOD OF IMPLEMENTING IMPROVED RATE CONTRO FOR A MULTIMEDIA COMPRESSION AND ENCODING SYSTEM	

REMARKS FOR REQUEST FOR PRE-APPEAL CONFERENCE

Mail Stop AF, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

I. Rejection of Claims 1 and 22-27

Appellants respectfully submit that Noh, Mihara, or their combination does not render claims 1 or 22-27 unpatentable. *First,* Appellants respectfully submit that Noh, Mihara, or their combination does not disclose, teach, or suggest a method for scaling a bit budget for encoding a digital picture. The Action analogizes a variation in quantization in Noh as a scaling factor. *See* page 3 of the Action. Specifically, the Action states that because "the target bit count R is directly dependent on the selection of quantization factor Q, this scaling is a method of 'scaling the bit budget'." *See* page 4 of the Action. Appellants respectfully disagree with the characterization of the quantization factor.

Appellants respectfully submit that Noh discloses that the target quantity of bits R to be allocated to each frame is calculated by dividing the quantity of an available overall bits by the number of P frames to be encoded. *See* col. 5, lines 64-67. Thus, the Action has mischaracterized Noh when stating that the target bit count R is directly dependent on a quantization factor. Instead, "the calculated quantization factor is a value that is used as a value that divides DCT coefficients calculated by the DCT." *See* col. 7, lines 22-26 of Noh (emphasis added). Thus, the quantization factor does not affect a bit budget for encoding a particular video picture.

Furthermore, Appellants respectfully submit that R, the quantity of bits to be allocated per frame, in Noh is determined by a target bit rate decision unit. *See* col. 4, lines 65-67 of Noh. Figure 1 of Noh illustrates the target bit rate decision unit 52 feeds its parameters into the quantization factor decision unit 54. Specifically, "the quantization factor decision unit 54 calculates a quantization factor Q **in response** to the MAD calculated by the MAD calculator 51 and the target bit rate R determined by the target bit rate decision rate [sic] 52." *See* col. 7, lines 18-22 (emphasis added). Therefore, R is not directly dependent on the selection of a quantization factor Q as the Action

states. Instead, Q is dependent on R because the target bit rate in Noh is determined before the determination of a quantization factor. *See* Fig. 1, item 52 (target bit rate decision unit) and item 54 (quantization factor decision unit) of Noh. Appellants respectfully submit that Mihara also does not disclose, teach, or suggest a method for scaling a bit budget for encoding a digital picture.

Second, Appellants respectfully submit that Noh, Mihara, or their combination does not disclose, teach, or suggest receiving a plurality of different scaling relationships for scaling a bit budget. The Action cites Noh's "receipt of parameter L as determining the limit to which the scaling can be relaxed as the claimed receipt of a scaling relationship." *See* page 4 of the Action. Appellants respectfully disagree with the characterization of L because the L parameter of Noh does not specify a scaling of a bit budget in relation to usage of a decoder buffer. Instead, L is a pre-determined upper limit which K, a coefficient of a quantization factor, is bound by. *See* col. 8, lines 51-53. Setting an upper limit to a quantization coefficient is not the same as a scaling relationship that specifies the scaling of the bit budget because, as discussed above, a quantization factor does not affect the bit budget for a particular video frame.

Appellants respectfully submit that Mihara also does not disclose, teach, or suggest receiving a plurality of scaling relationships for scaling a bit budget. The Action admits that Noh only provides for a single value of L used to determine the scaling relaxation, whereas Mihara teaches the selection from a plurality of mapping relationships. *See* page 4 of the Action. The Action states that the selection of a maximum VBV size in Mihara is analogous to the selection of limit L in Noh. *See* Id. Appellants respectfully disagree with the Action's comparison. The Action analogizes an upper limit L for a quantization variation factor in Noh to limiting the capacity (usable range) of a buffer memory when a bit rate designated by a controller is smaller than a threshold bit rate. *See* col. 15 lines 39-43 of Mihara. Appellants submit that limiting the capacity of a buffer is not the same as setting an upper limit for a coefficient of a quantization variation factor because a quantization variation factor is not related to nor does it affect the capacity of a buffer. Furthermore, Noh does not disclose varying the capacity of its buffer so it is improper to combine Noh's parameter L for setting a limit for a quantization coefficient with varying buffer capacity. Thus, Appellants respectfully submit that varying the capacity of a VBV buffer in response to a changing bit rate in Mihara is also not equivalent to receiving a plurality of scaling relationships for scaling a bit budget.

Third, Appellants respectfully submit Noh, Mihara, or their combination does not disclose scaling a bit budget in relation to usage of a decoder buffer. Specifically, neither parameter L of Noh nor VBV size of Mihara are related to usage of a decoder buffer. L is a pre-determined value and

therefore does not incorporate buffer usage in its determination. VBV size defines the capacity of the VBV buffer and is dependent on a bit rate provided by a controller. *See* Id. Thus, neither parameter is similar or analogous to a scaling relationship or a relaxation value. Since these parameters are also non-analogous with respect to each other, there is also no motivation to combine the terms to reach the claimed scaling relationships that specifies different relationships for scaling a bit budget in relation to usage of a decoder buffer. Appellants respectfully submit that the Action is attempting to combine two unrelated parameters that are not combinable in attempt to render Appellants' claims unpatentable. There is no motivation to combine or analogize the parameters as similar parameters nor would one skilled in the art find these parameters to be equivalent to parameters that affect the scaling of a bit budget in relation to usage of a decoder buffer.

Fourth, Appellants respectfully submit that Noh, Mihara, or their combination does not disclose different scaling relationships based on different relaxation levels. The Action characterizes different values of VBV size in Mihara as the claimed plurality of different scaling relationships. *See* page 4 of the Action. Appellants respectfully submit that Mihara teaches away from multiple scaling relaxations levels that correspond to different scaling relationships because Mihara varies the capacity of a VBV buffer when the bit rate changes from a first bit rate to a second bit rate at a halfway point while coding a GOP. *See* col. 15, lines 62-64. Appellants relaxation level does not affect the capacity of a buffer. Instead, the relaxation level identifies a particular scaling of the bit budget in response to buffer usage and the buffer capacity is never adjusted. Thus, the claimed scaling relationships are for allocating a bit budget to stay within buffer limitations, whereas Mihara teaches adjusting the capacity of the buffer itself. Since Appellants' bit budget is being scaled in relation to a static buffer size and the VBV buffer in Mihara is dynamically changed in response to changing bit rates, Mihara, Noh, or their combination does not disclose or suggest multiple scaling relaxation values.

Fifth, Appellants respectfully submit that Noh, Mihara, or their combination does not disclose or suggest receiving a value identifying a particular relaxation level. The Action states that parameter K of Noh, a coefficient of a quantization factor variation, is the claimed relaxation value. *See* page 2 of the Action. Appellants respectfully submit that, as discussed above, K is not equivalent to a relaxation value that corresponds to a particular scaling relationship. The relaxation value recited in Appellants' claims identifies a particular scaling relationship from a plurality of scaling relationships. However, the relaxation value K identified in the Action does not specify such a scaling relationship. The Action cites parameter L of Noh as the scaling relationship. *See* page 4 of

the Action. Appellants respectfully submit that L is a pre-defined upper limit to K and the value of K does not correspond to a particular scaling relationship. Since K does not affect the value of L, K cannot be the claimed relaxation value that corresponds to a particular scaling relationship.

Furthermore, the quantization coefficient K is calculated, not a received value. K is defined as LxD, where L is the limitation parameter and D is a deviation parameter that is used to determine the degree of variation of in the value of K. S*ee* col. 8, lines 1-14 in Noh. On the other hand, the claimed relaxation level is received from a user to allow a user to determine if a rate controller should strictly allocate its bit budget or to relax its standards such that the rate controller is not so conservative when allocating bits to particular video pictures. Therefore, Noh, Mihara, or their combination does not disclose or suggest receiving a value identifying a particular relaxation level.

Accordingly, Appellants respectfully submit that none of the cited references render claim 1 unpatentable. As claims 22-27 are dependent directly on claim 1, Appellants respectfully submit that claims 22-27 are also patentable and respectfully request reconsideration and withdrawal of the rejection of claims 1 and 22-27. Furthermore, Appellants respectfully submit that many of the dependent claims include novelties that are not found in the cited references. For instance, dependent claim 22 recites that a larger relaxation level results is a smaller scaling of the bit budget. However, the larger the parameter K (i.e. the Action's identified relaxation value in Noh) is, the larger a variation in the quantization factor is. *See* col. 8, lines 51-52 of Noh. Thus, a larger K value corresponds to a larger quantization factor, whereas a larger relaxation value in Appellants claim results in a smaller scaling of the bit budget.

Appellants respectfully submit that claim 23 is also not disclosed by the cited references. Claim 23 recites that the bit budget is not scaled when the decoder buffer does not deviate from a target path. Appellants respectfully submit that there is no mention or disclosure of a target path for decoder buffer in the cited references.

Appellants respectfully submit that claim 24 is also not disclosed by the cited references. Claim 24 recites a relaxation level of 0 results in a maximal scaling of the bit budget and a relaxation level of 1 results in no scaling of the bit budget regardless of buffer usage. Neither Noh nor Mihara discloses such a limitation. Regardless of the fact that Q is not equivalent to a factor for scaling a bit budget as the Action states, if the suggested relaxation value, K, is set to a value of 0 then, according to equation 9 of Noh, the quantization factor Q will not change at all.

Furthermore, claim 25 is also not disclosed by the cited references. Claim 25 recites a base scaling relationship that is identified when the relaxation level is 0, wherein the other scaling

relationships are derived using the base scaling relationship. As discussed above, the scaling relationships in Noh is identified as a pre-defined parameter L which sets an upper limitation to the quantization coefficient K. There is no discussion that L of Noh, nor the suggested VBV buffer of Mihara, is a base scaling relationship that other scaling relationships are derived from. Appellants respectfully submit that neither L nor the VBV buffers are for scaling a bit budget as discussed above and therefore cannot be characterized as a base scaling relationship. Thus, Noh, Mihara, or their combination does not render many of the dependent claims unpatentable.

II. Rejection of Claims 15, 16, and 20

Appellants respectfully submit that claim 15 was rejected along a similar rational as claim 1. Therefore, Appellants respectfully submit that claim 15 and dependent claims 16 and 20 are patentable over the cited reference for at least the same reasons discussed above for claim 1.

III. Inconsistent Association of Terms

Appellants respectfully submit that the Action inconsistently refers to different parameters as corresponding to particular claim terms within its rejections. For instance, the Action refers to the values of VBV sizes in Mihara as the claimed plurality of different scaling relationships on page 4 of the Action and then refers to the available VBV sizes as the claimed step of receiving a relaxation control value on page 7 of the Action. Furthermore, the Action refers to the quantization Q in Noh as the scaling factor on page 3 and 4 of the Action and then later refers to the generation of Q as the claimed determination of a scaling relationship on page 7 of the Action. The Action also refers to the receipt of parameter L in Noh as the claimed receipt of a scaling relationship on page 4 of the Action. Appellants respectfully submit that the Action's rejections lack merit because the Action is inconsistently characterizing different parameters as multiple claimed terms throughout the Action.

In view of the foregoing, it is submitted that all pending claims, namely claims 1, 15-16, 20, and 22-27 are in condition for allowance. Reconsideration of the rejections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully Submitted,

September 29, 2009
Date

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